



Comparative study of different catalysts mediated FAME conversion from macroalga *Padina tetrastrum* biomass and hydrothermal liquefaction facilitated bio-oil production

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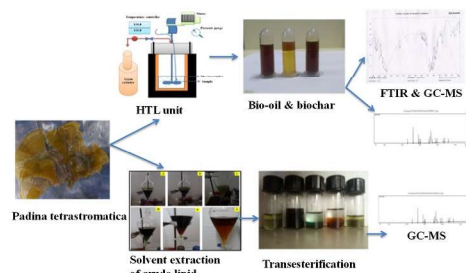
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HIGHLIGHTS

- *Padina tetrastrum* was employed for biofuel production using transesterification and hydrothermal liquefaction.
- Oil extraction by PE and DCM resulted in increased yield than the other solvents in liquid-liquid extraction.
- Maximum 92.3% of FAME recovery was achieved by TiO₂ nanocatalyst than conventional catalysts.
- Bioactive metabolites were identified from bio-oil through HTL reaction.
- Biofuel quality parameters of *Padina tetrastrum* met the international standards specifications.

GRAPHICAL ABSTRACT



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ABSTRACT

Marine macroalgae offer an enduring source of renewable biomass, which do not require cultivable area, fertilizers for cultivation for bioproducts production. In this study, marine brown macroalga *Padina tetrastrum* as an alternate sustainable feedstock for the production of liquid fuels. *Padina tetrastrum* biomass was collected from Mandapam; the coastal region of Rameswaram, Tamil Nadu, India. and the algal oil was extracted using sequential extractions using various solvents. Petroleum ether (PE) and dichloromethane (DCM) solvent fractions were found to have high lipids and further utilized for biodiesel production, wherein four different

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